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The Basic Importance of Applied Behavior Analysis

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We argue that applied behavior analysis is relevant to basic research. Modification studies, and a broad range of investigations that focus on the precipitating and maintaining conditions of socially significant human behavior, have basic importance. Applied behavior analysis may aid basic researchers in the design of externally valid experiments and thereby enhance the theoretical significance of basic research for understanding human behavior. Applied research with humans, directed at culturally-important problems, will help to propagate the science of human behavior. Such a science will also be furthered by analogue experiments that model socially important behavior. Analytical-applied studies and analogue experiments are forms of applied behavior analysis that could suggest new environment-behavior relationships. These relationships could lead to basic research and principles that further the prediction, control, and understanding of behavior.

Several recent papers have addressed the relationship between basic research in the analysis of behavior and applied behavior analysis (Baer, 1981; Deitz, 1978; Hayes, Rincover, & Solnick, 1980; Michael, 1980; Pierce & Epling, 1980; Poling, Picker, Grossett, Hall-Johnson, & Holbrook, 1981). Most of these publications suggested that applied behavior analysts should return to basic principles or at least make greater contact with these principles in their research. In contrast, Baer (1981) argued that applied behavior analysis was progressing without close ties to basic research and that there was no need to return to "the laboratory."

Generally, it has been assumed that applied behavior analysts can benefit from an acquaintance with basic principles. This position, however, has been "one-sided"—there has been some neglect of the importance of applied studies for basic research. In what follows, we argue that greater contact with applied problems and research may (a) enhance the external validity of basic research, (b) support the development of the science of human behavior, (c) suggest human and nonhuman analogues of important behavior problems, and (d) increase the discovery of basic principles of behavior through such analogues.

Baer (1981) has provided good reasons for an applied behavior analysis that is treatment oriented. Many practical problems require immediate attention and the technology of behavior change is available. Additionally, treatment-oriented approaches can lead to basic research questions. For example, the work of Ayllon and Azrin (1968) on the token economy was directed at improving the institutionalized behavior of schizophrenics. This technology is now having an impact on basic behavior analysis with a microeconomic perspective (see Kagel, Battalio, Green, & Rachlin, 1980; Rachlin, 1980; Winkler, 1980).

Clearly, direct behavior-change programs may have basic importance, but so too may other applied studies that are not directly concerned with therapeutic behavior modification. Such investigations are focused on analysis of everyday human behavior (e.g., cooperation), and have the long-range goal of improving the human condition. From our perspective, this research is part of applied behavior analysis (see Pierce & Epling, 1980). Research of this variety furthers the development of the science of human behavior by providing the basic principles of complex human interaction. Re-

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searchers in this area attempt to specify the "natural" contingencies that produce social problems (e.g., violence and aggression). The eventual practical importance of this analysis relates to the design of cultural practices (see Skinner, 1948, 1953, 1969, 1971) that may prevent the occurrence of many human problems. Thus, both treatment-oriented and analytical-applied studies are central to the experimental analysis of behavior.

Basic researchers can benefit from the pragmatic concerns of applied behavior analysts, perhaps at least to alter the increasing trend towards theory construction and seemingly "esoteric" questions that are not obviously relevant to the science of human behavior. Although a few basic researchers have suggested applications of Herrnstein's (1970) quantitative law of effect (McDowell, 1981, 1982) and the matching law (Myerson & Hale, 1984; Pierce & Epling, 1983), most researchers have not been concerned with such extensions. In addition, Catania (1981) has made the point that ". . . the laboratory behavior that is occasioned by questions about whether a particular law is correct or true is likely to be different from that occasioned by questions about whether particular variables affect behavior in particular contexts" (pp. 49–50). One important aspect of "context" involves correspondence between laboratory and extra-laboratory settings. A familiarity with applied research can enhance the generality of basic behavior analysis.

EXTERNAL VALIDITY, PRAGMATICS, AND APPLIED RESEARCH

External validity refers to the extent to which laboratory findings generalize to extra-experimental settings. A close association exists between external and ecological validity. Ecologically valid research is concerned with correspondence between laboratory procedures and ecological contingencies. This problem of validity addresses the question of whether processes and events found by controlled investigation are also operative in the ecological niche of the species. Fantino (1985) has discussed the importance of ecologically valid basic research and has suggested that the technology of the operant laboratory may be used to mimic field studies. He goes on to argue that experiments like this ". . . may successfully encourage an interdisciplinary or integrated approach to behavior" (p. 152).

Both external and ecological validity contrast with internal validity where the issue is whether an observed change in behavior may be assigned to the manipulation of the independent variable. Here the emphasis is on control in the experimental setting and not on the extension of research findings to the "real" world. Internal validity is the sine qua non of experimental research. Changes in the dependent variable must be uniquely attributed to variation in the independent variable. When experimental design has low internal validity, the research is uninterpretable and extensions beyond the laboratory are meaningless. For this reason researchers often justifiably emphasize internal, rather than external, validity of experiments. An exclusive focus on this source of validity, however, can produce research of little significance.

Campbell and Stanley (1963) have recognized that there is a "trade-off" between internal and external validity. They state that "both types of criteria (internal and external validity) are obviously important, even though they are frequently at odds in that features increasing one may jeopardize the other" (p. 5). Because internal validity is often obtained at the expense of external validity, some balance between the sources appears necessary. One way to achieve such a balance may be to use knowledge of applied research to create new experimental paradigms. By starting with applied questions (e.g., human conflict and aggression), experimental findings may eventually generalize beyond the laboratory and help to solve socially important human problems.

Of course, basic research may be pursued without reference to external valid-

ity. An alternative perspective stipulates that basic research must be conducted to discover and investigate principles of behavior. In this view, research may be completely abstract with no concern for external validity. It is assumed that the prediction and control of socially-significant behavior will follow from the discovery of basic laws. This implies that application and technology are informed by basic research but that there is little reciprocal influence. Such a position only permits applied behavior analysts to act as "consumers" of basic principles. The result of this asymmetrical interaction may be that applied researchers are assigned the role of technicians and analytical inquiry is not reinforced.

A perspective that gives paramount importance to internal validity and holds that principles of behavior only emanate from the laboratory may be termed the "abstract research model." Many basic researchers appear to adopt this model. Interestingly, the model has been accepted by applied analysts who frequently see themselves as "the implementers of principles." Although this perspective is "in vogue," this has not always been the case.

The early work of behavior analysts was based on the pragmatic philosophy of Skinner (1953), and applied and basic research were often interactive and complementary. For instance, in the first volume of *The Journal of the Experimental Analysis of Behavior (JEAB),* Flanagan, Goldiamond, and Azrin (1958) report on "Operant stuttering: The control of stuttering through response contingent consequences" and Azrin (1958) published "Some effects of noise on human behavior." These papers are representative of a broad range of articles concerned with socially significant human behavior. They demonstrate that researchers were choosing to study topographically-significant responses (rather than an "arbitrary" operant), and independent variables that were ecologically important (i.e., noise).

Basic researchers were more pragmatic and applied analysts were more analytical. This was evident ten years after the initial publication of *JEAB.* In 1968, the first issue of the *Journal of Applied Behavior Analysis* (*JABA*) appeared with research publications that emphasized principles. Brigham and Sherman (1968) published "An experimental analysis of verbal imitation in preschool children," and Schroeder and Holland (1968) published "Operant control of eye movements." Because the emphasis was on practically important environment-behavior relationships, applied behavior analysis had much to offer at the basic level.

Because basic researchers held a pragmatic view and applied researchers were interested in analysis, these fields were reciprocally interactive. This "analytical pragmatism" may have resulted from a common education in radical behaviorism and operant conditioning. These behaviorists were well trained in basic science and an epistomology that combined practical application with analysis. Little difference existed between applied and basic researchers and indeed it was common, at the time, to refer to oneself as an "operant conditioner."

The decline of "analytical pragmatism" and the rise of the "abstract research model" may be understood by an analysis of the economic contingencies. The "cure-help" approach to applied behavior analysis became prominent when behaviorists were offered positions where they were required to produce immediate benefits. These employment opportunities were a function of changes in funding that supported treatment-oriented research at the expense of analysis. Operant conditioners were successful in obtaining these jobs because they had developed the only useful technology of behavior change in the social and behavioral sciences (see also Pierce & Epling, 1980). Other behaviorists chose to remain, or to secure jobs, in pure research and academic institutions. These people may have been attracted to a university environment because it allowed and reinforced academic behavior such as constructing theories and building mathematical models. As applied analysts moved into

non-academic settings and basic researchers became isolated from practical considerations, the schism developed and the abstract research model became the "zeitgeist."

In our view, a return to "analytical pragmatism" is required. This statement is based on an assessment of the current "sterility" of much basic research and the apparent "triviality" of many applied studies. It could be asked, why should anyone care about this state of affairs? The answer is one of survival. Of course, there is no ultimate reason that behavior analysis "should" survive. If education and training have not established this as a value (i.e., reinforcement), then so much the worse for our discipline. In this case, cognitive explanation may replace analysis of contingencies of reinforcement (Pierce & Epling, 1984) and we shall become the "dinosaurs" of the social and behavioral sciences. Although we cannot control the vagaries of the economy, we can arrange educational and editorial contingencies.

Educational programmes could be arranged that integrated applied and basic research. Students would also have to be taught an "analytical pragmatism" that emphasizes the importance of studying environment-behavior relations with a view to furthering the science of human behavior. This perspective could show how applications follow from the development of a scientific analysis of behavior (see Skinner, 1953). From this view, applied behavior analysts could make a major contribution to basic research by discovering and testing principles in ecologically valid settings (see also Neuringer, 1984).

In addition to changes in education, the editorial contingencies of the major journals can be altered. With respect to the "basic" journals, researchers could be encouraged to address questions of external and ecological validity. They could point to how their findings extend to extra-laboratory settings. This would involve discussion of the generality of the experimental situation, comparison of laboratory contingencies with those assumed to operate in the non-laboratory environment, extensions of the research to an analysis of human behavior and specifications of commonalities between the topography of experimental responses and behavior in "natural" settings. Also, researchers could be urged to design experiments that stress greater external validity. A "trade off" may be required in terms of internal validity and editors would have to evaluate the merit of the extension against an assessment of control by the independent variable.

With respect to "applied" journals, editors could promote research that investigates socially significant behavior for its own sake. Treatment-oriented research would not have to suffer because of this policy. Some applied researchers may choose to continue with direct applications, others may prefer more analytic inquiry, and still others may do both. To illustrate, some behaviorists may modify family problems and others could study basic family interaction processes (see Gottman, Markman, & Notarius, 1977). Applied-analytical studies could be important in suggesting the conditions that establish interpersonal problems and might indicate the variables that produce positive social interaction. Such findings would be valuable to basic researchers and to the development of our science.

Returning to the question of what applied research has to offer basic behavior analysis, the answer depends in part on the prevailing model of research. If the "abstract research model" is the guide, then the answer is very little. Basic analysts will be concerned with theory-oriented or purely empirical research, and applied analysts will pursue a treatment approach. Alternatively, if an "analytical pragmatism" is adopted, then the applied/basic distinction would be reduced and applied behavior analysis would have basic importance. One major result could be the advancement of the experimental analysis of human behavior.

APPLIED RESEARCH AND THE SCIENCE OF HUMAN BEHAVIOR

Skinner (1953) suggested the possibility of a science of human behavior. He viewed this science as an extension of laboratory-based principles to humans.

It was assumed that the analysis of animal behavior in controlled environments would reveal basic laws that governed complex human behavior. Hake (1982) argued that behavior analysts adopted the belief that a science must begin with an analysis of simple processes. When elementary principles are established, the behaviorist may proceed to more complex organisms and environments. Although this strategy has been in effect for several decades, analysis of the precipitating and maintaining conditions that control many forms of human behavior has not yet occurred. To illustrate, in a recent review of the behavior analysis of creativity, Winston and Baker (1985) noted that behavior principles have been used to train "creative" behavior but little is known about its natural development. Thus, the extension of laboratory principles to humans often leads to a technology but does not always further the analysis of everyday human behavior.

The early success of applied behavior analysis in changing human behavior may have maintained this "simple to complex" research strategy. Laboratory-based principles generated a behavioral technology that often produced dramatic and large scale changes in socially significant behavior. This is exemplified in the work of Ayllon and Azrin (1968) where basic principles were combined to produce modification of "psychotic" behavior. The modification was accomplished by rearranging the entire hospital environment. Behavior of patients often showed improvement even in the chaotic setting of the mental hospital.

Such successful demonstrations of behavior change do not necessarily elucidate the natural development of human behavior. The conditions that establish and maintain "psychotic" behavior may be different from the conditions that modify it. Unfortunately, researchers are tempted to infer the generality of behavior principles from sucessful modifications. On this basis, there has been a lack of research concerning everyday human conduct.

Because broad-scale demonstrations of behavior change were based on laboratory principles, many researchers came to believe that the analysis of basic-laboratory processes was the correct approach to developing a science of human behavior. Based on these assumptions and interests, basic researchers adopted the role of "principle-givers" and the cure-help perspective became dominant in applied behavior analysis (Pierce & Epling, 1980). Unfortunately, much basic research no longer provides principles with obvious utility, and applied behavior analysts have become predominantly concerned with using old principles in new ways. Nonetheless, many behaviorists continue to uphold the view that a science of human behavior can evolve from laboratory-based principles.

An exclusive focus on this "simple to complex" strategy, however, may never lead to a complete science of human behavior. Once humans acquire a complex-verbal repertoire (i.e., language), the control of behavior by contingencies of reinforcement may be substantially altered (Bentall & Lowe, 1982; Spielberger & DeNike, 1966). In a recent study, Lowe, Beasty, and Bentall (1983) demonstrated that infants who responded for music or food reinforcement on several fixed-interval schedules closely matched nonhuman performance in response patterning and sensitivity to the contingencies. When animal or pre-verbal infant performance was compared with adults and older children, however, marked differences occurred. Lowe et al. concluded that the development of verbal behavior may have a profound influence on human learning.

Principles of learning may be different for verbal and non-verbal organisms. If this is the case, the "simple to complex" research strategy is not sufficient for the development of the science of human behavior. A "complex to simple" tactic is suggested by Lowe's research. The researcher begins with complex-human behavior and attempts to analyze the controlling variables. Once these conditions are identified, it will be apparent whether there is correspondence with laboratory-based principles. This tactic is exemplified by the work of Patterson (1985) who clearly states that laboratory principles

were not adequate in the analysis of coercive family interactions, and that new concepts and principles had to be identified in the field.

Applied behavior analysis can play an important part in analyzing complex human behavior, a role that would supplement the current emphasis on modification. Some applied researchers could describe the elementary processes of human interaction, the variables that establish, maintain and change these processes, and correspondence with basic principles. Such an analysis of socially significant human conduct is applied research. Social significance is determined by the "interest which society shows in the problem being studied" (Baer, Wolf, & Risley, 1968, p. 92). In this view, the only difference between basic and applied analysis is that applied research deals with behavior that is important to the culture.

Both forms of research are concerned with environmental and biological determinants of behavior. For example, an experimental analysis of the conditions that generate and maintain human aggression is applied research (e.g., Bandura, 1973). Such research would make several contributions to the science of behavior. First, the adequacy of known behavior principles would be tested in ecologically valid settings. Second, this research could suggest when, and under what conditions, behavior principles were limited by response topography. Finally, new environment-behavior relationships might be suggested that would prompt basic inquiry.

Applied behavior analysts can build on research that is found in several disciplines of the social and behavioral sciences. A useful initial strategy would involve writing major review papers from a behavioristic perspective. These papers could organize and integrate the research concerning diverse social problems such as altruisum, aggression, competition-cooperation, drug and child abuse, and so on. Much of the current literature is formulated from different perspectives, often with a cognitive slant, so that independent and dependent variables are frequently obscured and inferred. Nonetheless, many available studies may be reanalyzed and useful information extracted. For example, a volumous literature exists that deals with the social psychology of aggression that could be reviewed by behavior analysts. Some of this research was organized by Bandura (1973) in his book *Aggression: A Social Learning Analysis.* Radical behaviorists could review this research in terms of behavior principles and departures from what is expected. Once these review papers have organized the subject matters, direct experimental analysis in the laboratory or field would produce a more detailed, complete, and effective science of human behavior.

APPLIED PROBLEMS, ANALOGUE STUDIES, AND PRINCIPLES

An important and necessary aspect of the experimental analysis of applied problems involves the development of laboratory analogues with human and nonhuman subjects. Such analogue studies attempt to reproduce the fundamental processes that are involved in extra-laboratory behavioral phenomena. For example, research addressed to the question of human cooperation under bilateral-threat conditions (see Deutsch & Krauss, 1960) attempts to reproduce the essential factors that influence human bargaining and negotiation. This kind of research has not been prominent within the experimental analysis of behavior.

Most contemporary studies in the experimental analysis of human behavior are designed to test basic principles with human participants. For example, Bradshaw and his colleagues have studied the quantitative law of effect, and the matching law, with people (e.g., Bradshaw, Ruddle, & Szabadi, 1981; Bradshaw, Szabadi, Bevan, & Ruddle, 1976, 1979). In a typical experiment, subjects are required to press buttons for points that are exchanged for money, the question being whether humans will show lawful effects of contingencies of reinforcement. Studies such as these make an important

contribution to behavior analysis as "extension" research. The focus is to extend behavior principles to the human level.

Social importance is usually not central to extension studies but is a necessary feature of human analogue investigations. Researchers could develop more ecologically valid experiments that model specific applied problems. The experimental analysis of cooperation and competition is a step toward such an analysis. These investigations attempt to extract the fundamental aspects of such interpersonal processes (see Schmitt, 1984, for a review). Variables such as reward inequity (Schmitt & Marwell, 1972) and interpersonal trust (Hake & Schmid, 1981) have been operationalized and examined in terms of the operating contingencies. The results of this analogue research contribute to an understanding of social behavior.

Although direct analysis of socially important human behavior is necessary, ethical considerations often prevent such inquiry. Additionally, the "causes" of current human behavior may relate to extensive and unknown biological and environmental histories. These remote events can interact with the operating contingencies of reinforcement and thereby produce extreme difficulties for analysis. When this occurs, nonhuman analogues of applied problems can make a significant contribution to the science of behavior.

Nonhuman analogue studies may be viewed as another form of applied behavior analysis. Such investigations attempt to reproduce the essential elements of socially significant behavior. Once this is accomplished, research may focus on conditions that establish, maintain, or alter specified behavioral processes. The utility of nonhuman analogues for clinical psychology has been addressed by Suomi (1982) when he stated:

> Consider, for example, how animal models have contributed to our understanding of causal factors in various human pathologies. To begin, one can run prospective studies in which the goal is to produce the pathology in question in at least some animal subjects. Not only can such experiments permit direct empirical tests of competing hypotheses regarding the etiology of the pathology under study, but also sufficient and/or necessary conditions for inducing the disorder can be clearly established. (p. 253)

The utility of such analogue studies for applied behavior analysis is exemplified by the "learned helplessness" phenomenon. In the 1960's, graduate students working in Soloman's laboratory noted that dogs exposed to inescapable electric shock demonstrated performance deficits in learning subsequent tasks when shock was later contingent on incorrect responses. Animals also showed generalized suppression of operant behavior which was referred to as low motivation and reduced affect (Overmier & Seligman, 1967; Seligman & Maier, 1967). These researchers were familiar with symptoms of reactive depression in humans and suggested that the dog's reaction to noncontingent shock was similar to the human disorder (Seligman, 1975).

The work on learned helplessness illustrates how applied and basic research are often interactive. Behavior analysts who are familiar with the applied literature may inadvertently observe laboratory settings that produce unusual behavior patterns. Some of these patterns may resemble important human conduct. The researcher who pursues these lines of inquiry may help in the understanding of the human phenomenon and may at the same time discover new principles of behavior. Applied researchers may also contribute to the discovery of useful nonhuman analogues. When these investigators are acquainted with basic research, they may be able to identify laboratory phenomena that are similar to socially important human behavior. Communication of these observations to basic researchers may prompt new experiments. Alternatively, the applied researcher may pursue nonhuman analogue experiments on an independent basis.

Nonhuman experiments can be conducted that are analogous to normal human processes. Applied research concerning problems with human develop-

ment and social interaction can sometimes be addressed by nonhuman analogue studies. The development of parent-infant attachment has been modeled with macaque monkeys. Harlow and Zimmerman (1959) reported that the development of perception, learning, manipulation, exploration, frustration, and timidity in the macaque is very similar to development in the human infant. The major difference between the species was advanced maturation and rapid growth by the infant macaque. Although Skinner (1969, pp. 199–200) has objected to Harlow's work because the controlling variables may not be the same for these monkeys and humans, Harlow and Zimmerman argue that there is reasonable functional similarity. They state that "probably the most important similarities between the two (species), in relation to the problem of affectional development, are characteristic responses that have been associated with, and are considered basic to, affection: these include nursing, clinging, and visual and auditory exploration" (p. 423).

Once these behavioral commonalities were established, Harlow and his associates went on to investigate how parent-infant attachment occurred. Data based on choice between cloth and wire mother surrogates who either "nursed" or did not feed the infant macaque indicated that the cloth mother was preferred. This was so regardless of whether the surrogate nursed the infant. The results suggested that "contact comfort" exerts more control over attachment behavior than feeding. This finding weakened the secondary reinforcement hypothesis of maternal attachment. Subsequent work by Harlow's students at Wisconsin has extended the analysis of attachment formation and the implications of disrupting this relationship (see Suomi & Ripp, 1983). The overall implications of this research relate to the understanding of human socialization processes and the importance of maternal factors for social development.

Nonhuman analogue studies are not the same as behavioral simulations. For example, food-related contingencies can be arranged for pigeons that produce behavior having some features in common with human awareness (Epstein, 1981; Epstein, Lanza, & Skinner, 1981). Epstein et al. (1981) summarized their results by stating that "we have shown how at least one instance of behavior attributed to self-awareness can be accounted for in terms of an environmental history" (p. 696). An underlying assumption appears to be that, since the bird behaves in an "aware" manner, human self-awareness is due to these or similar contingencies. However, if a seal is taught to "play a tune" by presenting fish contingent on a sequence of horn honking, clearly the contingencies have little resemblance to those that establish human musical performance. The fact that arbitrary contingencies produce something that looks somewhat like humans playing music or being aware of themselves does not imply that we know the determinants of either behavior in humans. Such behavior may arise from quite different contingencies or may be controlled by environmental events that operate on the basis of genetic endowment (see Savage-Rumbaugh, 1984; Terrace, 1985).

Behavioral simulations can be contrasted with more ecologically valid nonhuman experiments. Recent research on activity anorexia in rats provides a useful illustration (Epling, Pierce, & Stefan, 1983). When rats are fed one 90-min meal per day they initially lose weight, but over a few days adjust their food intake and survive. Animals exposed to the same food schedule but allowed free access to a running wheel *except while being fed* continue to lose weight and die. These animals also demonstrate increasing amounts of wheel running over days. As running increases, a suppression of eating ocurs that is associated with a decline in body weight. The loss of weight further increases wheel running to excessive levels (up to 20,000 revolutions per day) and food intake drops to less than 1 g per day. Importantly, animals that fail to run, for whatever reason, increase food consumption and survive (see Epling & Pierce, 1984).

This process of activity anorexia occurs without any explicit contingency be-

tween food and wheel running (Routtenberg & Kuznesof, 1967). All that is required is to feed the animal once a day and provide a running wheel during the remaining time. Epling et al. (1983) argue that the phylogeny of the organism has prepared it to respond in this manner to changes in food allocation. In the case of anorexia, the behavioral processes in the rat have correspondence with reported cases of anorexia nervosa. Also, the relationships between exercise, food intake, and body weight are similar in rats and humans (see Epling et al., 1983 for substantiation of these statements).

The basic importance of this applied-animal research is that investigators can begin to examine the variables that control the relationships among activity, eating, and deprivation. The implications extend to feeding or foraging models that are of current interest to basic behavior analysts (Fantino, 1985; Staddon, 1980). At the same time, because of the correspondence with human anorexia, basic research may shed light on the determinants of socially significant problems involving diet and exercise. Perhaps most importantly, this analogue and others could specify new environment-behavior relationships of theoretical interest. For example, Pierce, Epling, and Boer (in press) extended the implications of activity anorexia to basic behavior principles. They found that the reinforcement effectiveness of wheel running increased with food deprivation. Also, satiation for wheel running decreased the reinforcement effectiveness of food. These were unanticipated relationships that were suggested by the applied problem. Thus, applied behavior analysis and analogue studies with humans or other animals may contribute to the discovery of new behavior principles.

Although many operant principles are now well established, a viable science of behavior must continue to discover lawful relationships and principles. This statement is based on the assumption that there is much left to analyze. Such an assumption is reasonable since even our most advanced natural sciences are not complete. Although the environment can only be partitioned into antecedent and consequent events surrounding behavior, our current understanding of these relationships may be incomplete (Pierce & Epling, 1984). The control of schedule-induced and adjunctive behavior does not easily fit within the operant three-term paradigm—new principles may be needed to account for such behavior (Staddon & Simmelhag, 1971). Similarly, the experimental analysis of socially significant behavior may suggest the control of new classes of behavior that would not be expected from the operant viewpoint (e.g., social facilitation, Zajonc, 1965). When such findings occur, basic researchers will be in a good position to take advantage of the stipulated relationships and to search for the underlying principles of such behavior.

CONCLUSION

Many behavior analysts have not considered the importance of applied behavior analysis for basic research. We argue that applied behavior analysis includes modification studies and a broad range of investigations that focus on the precipitating and maintaining conditions of socially significant human behavior. Attention to this literature would increase the external validity of experiments and theories at the basic level. Also, applied research that specifies the determinants of natural human development would advance a science of human behavior, and suggest cultural designs that would prevent behavior problems. Finally, human and nonhuman analogue studies would advance both science and technology. Based on either direct analysis or analogue studies, applied behavior analysis could reveal new environment-behavior relationships that lead to basic research and principles.

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